CLAIMS

What is claimed:

1. An optical storage medium comprising a polymer material having an optically activated molecular transition between a first geometric orientation and a second geometric orientation, the medium being writeable and readable with light within a wavelength band.

2. The optical storage medium of Claim 1 wherein the wavelength band comprises an absorption band of the polymer material.

3. The optical storage medium of Claim 1 wherein the polymer material comprises a solid state thin film material having a holographic grating.

4. The optical storage medium of Claim 1 wherein the polymer material comprises an azobenzene isomer material.

5. The optical storage medium of Claim 1 wherein the polymer material has a first absorption band in a red spectral region and a second absorption band in a blue spectral region.

6. The optical storage medium of Claim 1 wherein the polymer material is readable and writeable at the same wavelength.

7. A system for optically recording information in a storage medium comprising a first coherent light source and a second light source that are optically coupled to a storage medium such that the medium is irradiated with coherent light with a first polarization component and irradiated with light from the second light source having a second polarization component.

8. The system of Claim 7 wherein the storage medium comprises a polymer material having an optically activated molecular transition between a first geometric orientation when irradiated by light from the second light source and a second geometric orientation when irradiated by light from the first coherent light source.

9. The system of Claim 8 wherein the polymer material comprises a solid state thin film material having a holographic grating.

10. The system of Claim 8 wherein the polymer material comprises an azobenzene isomer material.

11. The system of Claim 8 wherein the polymer material is readable and writeable at the same wavelength.

12. A method for forming a non-volatile storage system, comprising the steps of

preilluminating a storage medium with polarized light;

illuminating the medium at a first wavelength of light polarized in a first direction;

illuminating the medium at a second wavelength of light polarized in a second direction that is different than the first direction.

13. The method of Claim 12 wherein the preilluminating step comprises illuminating the medium with circularly polarized light.

14. The method of Claim 12 further comprising recording information in the medium by illuminating the medium with the first wavelength and the second wavelength such that the first direction is orthogonal to the second direction.

15. The method of Claim 12 wherein the storage medium comprises a polymer material having azobenzene isomer material therein.

16. A method for optimizing reorientation of photoisomeric molecules, comprising the steps:

illuminating the molecules at a first wavelength of light polarized in a first direction; and

illuminating the molecules at a second wavelength of light polarized in a second direction that is different than the first direction.

17. The method of Claim 16 wherein the light polarized in the first direction is light in a blue spectral region.

18. The method of Claim 16 wherein the light polarized in the second direction is light in a red spectral region.

19. The method of Claim 16 wherein the first direction is orthogonal to the second direction.

20. The method of Claim 16 further comprising a step of preilluminating the photoisomeric molecules with polarized light.

21. The method of Claim 16 further comprising optimizing a process of poling to enhance at least second order, non-linear optics.

22. The method of Claim 16 wherein the photoisomeric molecules are azobenzene isomer material.

23. A method for optically writing information to a medium comprising a polymer material having photoisomeric material, comprising the steps of:

providing a first light with a first polarization component onto the surface of the medium;

generating at least one of trans-cis isomerization and molecular reorientation or the photoisomer material;

providing a second light with a second polarization component onto the surface of the medium;

forming a holographic grating; and

generating cis-trans isomerization wherein a non-volatile orientation grating is formed.

24. The method of Claim 23 wherein the photoisomer material is an azobenzene isomer material.

25. The method of Claim 23 wherein the first polarization component has a direction that is orthogonal to a direction of the second polarization component.

26. The method of Claim 23 wherein the first light is in a blue spectral region.

27. The method of Claim 23 wherein the second light is in a red spectral region.